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AUTHOR Hass, Wilbur A.
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ABSTRACT

Children's language acquisition is viewed by developmental psycholinguists as a process of change in the organization of language processing operations. Normal children seem to acquire their native language by this process, rather than by eliminating specific mistakes. Preschool language develops in stages, and knowledge of where syntactic change is likely to occur should be used in planning and evaluation of early education programs. It is useful to know why certain syntactic constructions are to open to change in the preschool years. For example, three processes are involved in the production of elaborated noun phrases. They are (1) surface syntactic structure, (2) deep structure, and (3) syntactic transformations. These aspects of processing language can be facilitated by instruction in perceptual-motor skills, by use of referential cues in the language situation, and by role playing with serious communicational intent. Current language curricula combine these aspects in unsystematic ways, so that it is not clear what processes have been affected when a change takes place in a child's grammatical construction. Ultimately, language programs should be directed to the individual's specific language needs. Cognitive facilitation is not necessarily to be expected but is dependent upon the particular features included in each program. (NH)

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ON THE HETEROGENEITY OF PSYCHOLOGICAL PROCESSES IN SYNTACTIC DEVELOPMENT[1]

Wilbur A. Hass

University of Chicago

The study of children's language acquisition has a long and venerable history in psychology, including both relatively informal observations (Stern and Stern, 1928) and highly quantified tabulations (McCarthy, 1954). Recently the area has been revitalized by advances in linguistics and in developmental psychology. Linguistics has contributed techniques for describing the incredibly interwoven structures which comprise the adult's knowledge of a language (Fodor and Katz, 1964; Langacker, 1968). This is reflected in grammars of English which look quite different from the ones we used in grammar school (e.g., Jacobs and Rosenbaum, 1968; Langendoen, 1969). Developmental psychology has contributed techniques for describing how psychological processes become reorganized as the child grows up. One way of portraying the Piagetian revolution is in terms of a graded description of how a person may do very similar things with quite different psychological bases. These two contributions are coming together in developmental psycholinguistics, which is exploring how they mutually illuminate each other (McNeill, 1966; Sinclair-de-Zwart, 1969). Developmental psycholinguistics should be relevant to the practices of early education (whether or not it is intended to be compensatory). This paper attempts to characterize certain points of relevance in the area of syntax.

Characterizing the Child's Language

Developmental psycholinguistics arose out of a methodological insight; namely, that a child's utterances should be examined as if they were a corpus from an exotic language. That is to say, one should be careful of reading into them more structure than is required to account for what is actually observable. In particular, one must be careful not to assume that they have

the structural features of the language of surrounding adults. This procedural principle is more than just a scientist's whimsical purism; it leads one to look at what the child is doing from another point of view. A young American child has more in the way of language than a slightly incomplete and inaccurate version of English; he has a way of dealing with language which is general and abstract. To focus on some feature of his language as "bad" English is to miss the point that that feature plays a definite role in his language structure and shows the processes he is bringing to bear in working on language. Phrased along these lines, language development is seen as a process of change in the child's organization of his language processing operations; this, far more than the elimination of specific mistakes, is what the normal child seems to be doing as he acquires his native language.

Investigators who have studied the naturalistic observations collected by the projects led by Roger Brown and Susan Ervin-Tripp (Bellugi and Brown, 1964; McNeill, 1966) have been amazed at the young child's ability to get to the heart of language structure. In trying to characterize this ability typical of the members of the human race, investigators have sometimes been driven to paradoxical statements. Thus, David McNeill was driven to characterize his presentation to a conference of early educators at Yeshiva by saying that "the problem of acquiring a language does not exist" (Gordon, 1966, p. 36). Such presentations have usually included implications or statements that the very young child already knows what is most essential about language and that individual differences in this respect are minimal, probably not directly related to the environmental conditions of the child. Is it any wonder that such presentations have aroused considerable puzzlement and frustration in those who wish to assist language development through early education?

The point is that children's language contains a good deal of organization--organization which we as adults are likely to ignore if we approach a child and are struck by the fact that he phrases something he says in a "queer" way. And this point is similar in nature to the ones made by linguists in describing primitive languages and by Piagetians in describing the child's "lack of logic."

Developmental Change in Language Structure

The organization of children's language <u>does</u> undergo change as children get older. If one follows a certain type of construction throughout the preschool years, as Bellugi did for negation in her doctoral dissertation (1967), a vivid series of sequenced stages appears. These are related to more general reorganizations in the shape of the child's grammar (Brown, Cazden, and Bellugi, in press). This sort of information should be of direct use in planning and evaluating early education programs. It tells one where syntactic change is likely to be occurring for a given child or for children of a given age.

But we can aim for additional goals; we can strive to indicate not only <u>what</u> syntactic constructions are suitable for early education, but also <u>why</u> those constructions admit of change. Let me indicate what I have in mind through an example. We know that interesting things happen (in the preschool years), as well as from initial word combinations and throughout the school years in the use of adjectives to modify nouns. What is involved in the changes in such noun phrases? What is it about a child's functioning that is altered as the form of his language changes? We know enough about the structure of language now to be able to infer, with some specificity, that <u>three types of processes</u> may be at work in the production of elaborated noun phrases.

The first type of process parallels surface syntactic structure, which is familiar to most readers. Surface syntactic structure is characterized by the familiar branching tree structure which divides a sentence into its major

constituents, and each of these constituents into its constituents, until individual meaning units about the size of words are reached. The relevant psychological processes here are ones of scheduling language, as it proceeds in time; through these techniques one can "keep one's place" in the speech stream as one talks or listens. Noun phrases are interesting in this regard in English because they may involve a good deal of left-branching; if one has a phrase like "the fine old stone houses," one has to keep in mind that "fine" goes with "houses" even though a number of other words may intervene. The speaker of English must develop schemas that react to "the fine old stone houses" as OK, but to "the stone old fine houses" as odd---as just not sounding right. Properties which such perceptual-motor schemas must have have been described by Lashley (1951) and Yngve (1960).

Second, there is the matter of deep structure. It is not enough just to know if a noun phrase "sounds right;" one must also know how it can be used to refer to something in the world. The linguistic techniques for describing the propositional content of phrases and sentence are under a good deal of debate; no one formulation would suit very many (Chomsky, in press; Bach, 1968; McCawley, 1968). In terms of psychology we are on the familiar, if not precisely formulated, ground of symbolization. Thus, English adjectives, to continue with our example, usually attribute some property to the nouns they modify. Bound up with the use of such noun phrases is the cognizing of a world organized along property vs. entity lines. Not only that, but different subclasses of English adjectives differ in the sorts of properties they denote, so that the property-space is not a homogeneous one.

Still a third sort of factor is given recognition in syntactic transformations. Actually, what is involved here, in terms of linguistic structure, is more correctly described as the particular organization of deep structure which leads some transformations, but not others, to be applicable. This sounds hopelessly complicated, but the phenomenon is a widespread one.

Think, for instance, of the relation between "stone houses," "houses of stone," and "houses which are made out of stone." The closest psychological parallel here is the process by which one packages the referential content into a "wording" which fits into the communicational setting; a technique for relating what it is that we are talking about to the situation in which the talking is actually going on. Thus, "the stone houses are old" and "the old houses are made out of stone" don't differ in what they are about--namely, some houses which are old and which are made out of stone--but they arrange that content so that one or the other of the properties is made more salient. Different types of transformations involve the speaker's stance toward what he is saying (asserting, denying, questioning, etc.), the conveying of emphasis, the adjustment in terms of who the speaker is and when he is speaking, and the paring off of redundancies and irrelevancies, among other things. What processes are carried out here are clearly related to social psychological formulations of role-theory.

The point of what has just been said is that, for any grammatical construction one cares to look at, there are at least three ways of viewing it and relating its use to psychological processes. The implication for language programs in early education is that one must examine, not only whether a certain construction can be produced or understood by a child, but how one or more of these three aspects of processing language can be facilitated. With this ideal in mind, we can take each of the three aspects of grammar, mentioned above, and briefly examine each with respect to three issues: (a) what characterizes developmentally more advanced functioning in terms of that aspect; (b) how may developmentally more advanced functioning be facilitated, given our understanding of the psychological nature of that aspect; and (c) can the facilitation of developmentally more advanced functioning in that aspect be expected to lead to general cognitive benefits?

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Surface Syntactic Structure

How does this develop? Some ways are readily recognized in the most commonplace measures of language: increase in number of terminal elements (vocabulary size); increase in number of terminal elements included within syntactic organization (sentence length); and so on. Sometimes a process of subdivision of terminal units apparently takes place; what has been a single unit for a child becomes a "phrase." The process of refinement and decontextualizing of surface-syntactic categories seems to continue throughout childhood.

Socioeconomically disadvantaged children are probably somewhat lower on most such indices one might devise. However, a more striking fact is that such children do have a rich surface structure, which is sometimes indistinguishable on current measures from that of middle class children. Attempts to do language training in this area have usually been in the direction of altering a few superficial differences between the dialect of the child and more standard American dialect. Attempts at early education, either of the "linguistic cosmetics" sort just mentioned or of more broad-gauged efforts to improve general parameters of surface syntactic structure, are best fashioned along the lines of instruction in perceptual-motor skills. The primary curricular problem is securing enough drill which is engrossing enough that the child will approach it with some enthusiasm. The possibilities for general cognitive facilitation from such practice are approximately parallel to those for expecting increase in IQ from learning how to swim with a butterfly stroke. I say "approximately parallel" because children probably tend to read transformational and deep structural relevance into language even when no cues have been provided in the training process.

Deep Structure

Despite disagreement on the exact form of descriptions of deep structure,

and therefore on the representation of developmental change in deep structure, what is relevant here is the change in the way the child organizes the symbolic content of his language. Such change must be closely tied in with all that we know about cognitive development. Accordingly, changes like those in transposition and reversal shift (as studied by experimental child psychologists), to say nothing of Piagetian tasks relevant to the establishment of concrete operations, should be paralleled in the organization of deep structure. One should not, for instance, assign semantic markers to a child's system unless one has reason to believe that he does indeed treat the marker in question as a bipolar dimension. The establishment of how children handle such semantic dimensions and relations is essential in describing the form of their meaning system. A simple paradigm here would be the syntagmatic-paradigmatic shift in word association, which needs to be studied with additional variations. The status of socioeconomically disadvantaged children in these respects can hardly be settled at present. Presumably, at least as a makeshift, one can rely on referential cues in the language situation to be of value in the early education of deep structure; what one ultimately wants, of course, is for the child to be able to talk about things that are not present in the here-and-now.

Concern with modification of deep structure is evident in Carl Bereiter's program (Bereiter and Engelmann, 1967). I would agree with his implication that changes in a person's deep structure can hardly fail to be related to his general way of thinking about things, since by definition deep structure is that aspect of language tied up with semantic interpretation. What I have reservations about in Bereiter's rationale is the assumption that deep-structure features are directly mapped onto surface structure. That this relation is, instead, most indirect has been demonstrated by the cumulative revisions in transformational linguistic theory. For any semantic content

you might propose, there are several very different ways that it may be expressed in surface structure, as well as vice versa. What psychological rationale can be given for this indirectness? As mentioned above, we have in mind the evolution of language to fit into interpersonal communicational settings, and the concurrent transformational "packaging devices." In artificial languages, like the logics to which Bereiter refers, such devices have been eliminated as nearly as possible. To teach a child such a logic might be of some value, but it is not training in the full potentiality of natural language.

Transformations

There is evidence from Roger Brown's data that, at least in the early stages of language development, the number of transformations that can be performed by a child does increase (Brown and Hanlon, 1968). Whether there is additional ordering in terms of which types of transformations come before which other ones is not certain. A large number of studies have shown that as children get older, they get better at describing objects in ways that enable others to determine what they are talking about--at adjusting their language to fit the communication situation. Socioeconomically disadvantaged children are particularly poor at such tasks; this "communicational egocentrism" on their part is, I believe, only one sample of the relative paucity of transformational processes in young disadvantaged children.

How can transformational processes best be taught? Procedures can be developed, in line with G. H. Mead's stress on reciprocity in role relations, since a major aspect of transformational functioning derives from taking the role of the other. This point is obviously related to Basil Bernstein's (1965) hypothesis that children with few and rigid role relations should have "restricted" language. At any rate, transformational processes are bound up with situations in which speakers take complementary and interchanging stances toward whatever it is that they are talking about. This requires,

not merely labeling drill, but situations in which both speaker and listener have serious communicational intent--i.e., they really have something to say to each other. Exactly how to shape such interaction toward particular goals in language curriculums in early education critically needs attention.

When such transformationally related processes are a part of early education, they would seem to go hand-in-hand with more general role taking skills, as may be inferred from Flavell (1968). The expected benefits from such a program are not synonymous with good social adjustment, as witness the communicational skills of the con man. But the relevant cognitive benefits should be peculiarly social and personal in nature; while training in deep structure might lead to the development of language <u>about</u> human beings (if that were the content emphasized), transformational training would be directed toward the development of language <u>with</u> human beings.

The Developing Nature of Language Rules

The whole matter of language training in early education is made even more complicated by the overall change, as the child grows up, in the sense in which he may be said to "have" language rules of any sort. A 2-year-old may have regular patterns of word-combination; and one may speak of these as exemplifying his "rules." But such rules are far different, psychologically, from the self-conscious rules of the adolescent. One cannot imagine how to find out if the 2-year-old thinks of syntactic rules as inherent in language, as regulated by society, or as matters of personal language sense--but these are quite natural matters to inquire into once he gets somewhat older. One would expect that the child's conception of rules of language would follow the general Piagetian trends as do his ideas about rules of other sorts. How the status of rule concepts interacts with the various aspects of language mentioned above, in the period when operationality is coming into being (that is, the period when we attempt early education) deserves to be investigated

in its own right.

Conclusion

What are the implications for the design of language curriculums of the picture of language development that has just been painted? Currently established programs combine the aspects we have discussed in various unsystematic ways (Brottman, 1968). Thus, if one sees change in the use of a certain grammatical construction by a child, one has no way of knowing whether one has affected processes related to surface structure, deep structure, and/or transformations. These shotgun approaches are the best one can do at present; in order to try to get change in language, one puts everything that looks promising into the training program. Ultimately, we may look forward to the design of syntactic rifles--programs which are directed toward a certain process which seems to be particularly underdeveloped in the children with whom one is dealing. One would expect a quite different sort of program for bilingual children than for disadvantaged children, and a somewhat different program for black urban slum children than for Appalachian children. Whether we would expect general cognitive facilitation from the program would be a function of the particular features that had been included in it. If this paper has made the reader suspicious of global statements on the influence of language training on cognition, it has achieved its major goal.

FOOTNOTES

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